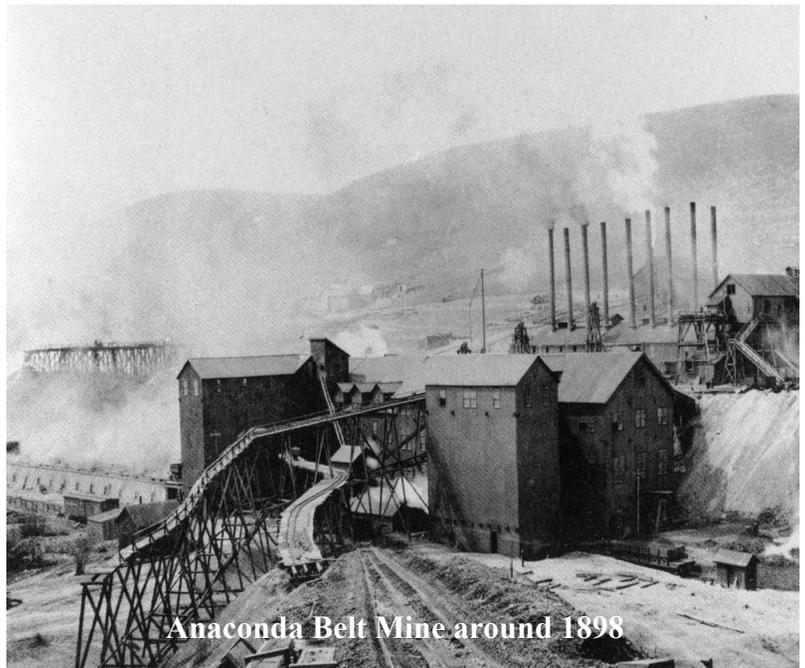


Water Treatment for Acid Mine Drainage in Belt, Cascade County

Background

Numerous coal mines once operated around Belt starting with the mine opened by John Castner in 1877. In 1893, Anaconda Copper Mining purchased Castner's coal mine and the size of the operation increased rapidly. Coal production from the Anaconda Belt Mine peaked in the late 1890s and included a workforce of 1200 employees. The mine followed a six foot coal seam over 12,000 feet west from the mine adit, which was near the current location of the Belt water storage tanks. Room and pillar mining was conducted with coal removed from rooms and pillars of coal left to support the roof of the mine. The operation included one hundred beehive ovens producing coke for copper ore smelting in Anaconda and Great Falls. Following the turn of the century, coal production from the mine slowed and the mine closed in 1924. Smaller mines located on the east side of Belt Creek operated as late as 1963.



Anaconda Belt Mine around 1898

The Problem

The coal includes sulfur in pyrite nodules up to 4 inches in diameter. Groundwater flows through the open mine workings and pyrite in the coal breaks down forming sulfuric acid. The water discharging from the mines is highly acidic and contains extremely high levels of dissolved metals. The abandoned mines discharge approximately 250 acre-feet of contaminated water to Belt Creek each year. On average, approximately 700 pounds of iron and 500 pounds of aluminum are discharged each day. This contaminated water accounts for much of the flow in Belt Creek during base flow conditions from the late summer through early spring each year. Lower Belt Creek has been identified as an impaired water body not fully supporting its beneficial uses.



Acid Mine Drainage contaminating Belt Creek

Cleanup Alternatives

The high metal loads and extended winters limit the effectiveness of passive treatment approaches such as the use of constructed wetlands. The Abandoned Mine Lands Program is evaluating active treatment technologies to address the acid mine drainage and contamination of Belt Creek.

Water Treatment for Acid Mine Drainage in Belt, Cascade County

Abandoned Mine Lands

2016

Active treatment of mine impacted water has proven to be successful in Montana and across the country in treating mine impacted water. An **Engineering Evaluation/Cost Analysis and Environmental Assessment For Water Treatment of Acid Mine Discharges in Belt, Montana** has been developed. The evaluation considers multiple treatment technologies and options for disposal of the byproducts of the treatment process. The preferred alternative employs hydrated lime to neutralize the acidity of the mine impacted water. The second step of the treatment process is the clarification step in which precipitated metals are removed. Hydrated lime is widely used in treating mine impacted water because it provides the most cost-effective means of neutralizing acidic water. The proposed alternative for water treatment has proven to be robust and effective in many applications. The complete draft Engineering Evaluation/Cost Analysis and Environmental Assessment document is available online at <http://deq.mt.gov/Land/abandonedmines/currentprojects/belt>.

Schedule

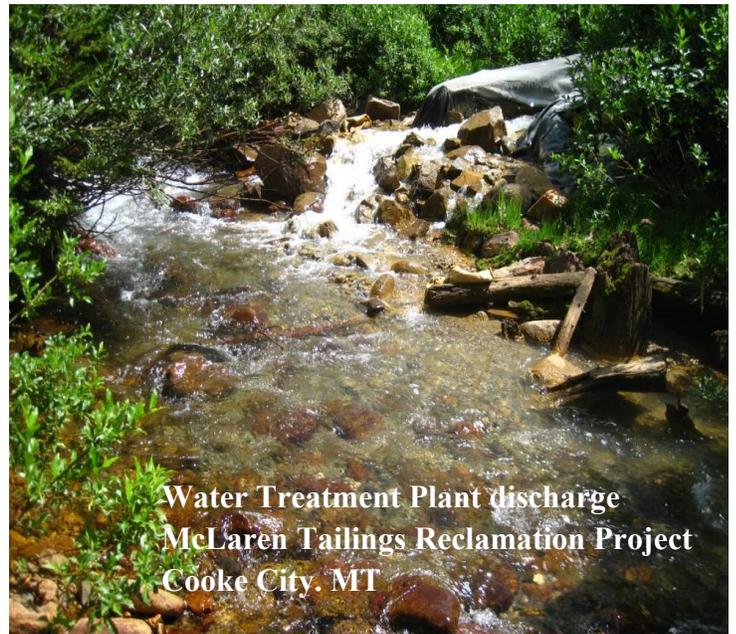
A Public Meeting will occur in November 2016 to present the Engineering Evaluation/Cost Analysis and Environmental Assessment and solicit comments from the public. The public comment period will conclude January 2, 2017. Drilling will be conducted over the extent of the Anaconda Belt mine in the Fall of 2016. This work will be performed to evaluate the conditions inside the mine including the amount of open workings and the amount of water inside the mine. The information is necessary to determine if conditions are favorable for injecting the sludges generated by the treatment process into the mine.

Following the receipt of public comment, the Engineering Evaluation/Cost Analysis and Environmental Assessment will be finalized. Engineering specifications for the water treatment plant will be developed in 2017 and the project will be released for bidding. It is expected that construction of the facility will occur in 2017 and 2018. The facility is scheduled to be operational in 2019.

Public Benefit

The residents of Belt have lived with acid mine drainage and the contamination of Belt Creek for over 100 years. The ditches that convey the acid mine discharges are open and freely accessible to the public. The Anaconda Mine discharge enters Belt Creek opposite of the Belt City park. A sandy beach area is located on the opposite bank from the discharge, and this area is utilized as a swimming area by the community.

The proposed treatment provides the most certain method to minimize human exposure to the mine water and environmental contamination. Successful implementation of this project will greatly benefit residents of Belt and all Montanans by treating the mine discharges and returning Belt Creek to fully supporting its beneficial uses.



Water Treatment Plant discharge
McLaren Tailings Reclamation Project
Cooke City, MT

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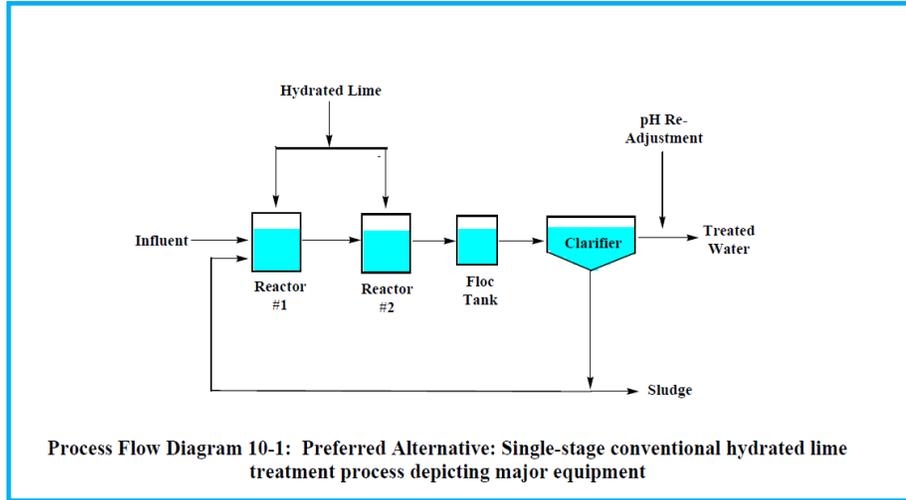
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Water Treatment Plant Concepts



The preferred alternative in Belt is a Single-stage conventional hydrated lime treatment process with a clarifier.

Hydrated lime would be added to acid mine drainage, flocculent would be added and then sludge would settle in a clarifier.

The proposed Belt Water Treatment Plant would occupy approximately 2 acres in Coke Oven Flats outside of Belt, Montana.

Similar water treatment plant in Swift Gulch at the Zortman-Landusky Mine near Hayes, Montana.



Flocculent is added to condense the sludge.



Clarifier Unit designed to filter out the sludge for disposal. The result would be a discharge of clean water to Belt Creek.

Clarifier Unit will be similar to the one pictured here in Pennsylvania.



Acid mine drainage sludge created after treatment. Three alternatives are considered for sludge management:

1. Reinjection into the underground mine workings (no visible sludge ponds).
2. Disposal in a DEQ repository near Belt.
3. Disposal in a licensed landfill.